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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/287,579	04/06/1999	LE LI	REVEO-9999	6469

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EXAMINER	
QI, ZHI QIANG	
ART UNIT	**PAPER NUMBER**
2871	

DATE MAILED: 04/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/287,579	LI ET AL.	
	Examiner	Art Unit	
	Mike Qi	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 February 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *41-67 and 83-89* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *41-67 and 83-89* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 41 and 83 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,749,261 (McLaughlin et al) in view of US 6,172,720 (Khan et al), US 6,049,336 (Hakemi et al) and US 4,131,581 (Coker).

Claims 41 and 83, McLaughlin discloses (col.4, lines 44-47; col.5, lines 28-47; col.8, lines 14-19; Figs. 2-3) that the liquid crystal sunroof (10) includes two transparent surfaces (22,24) and liquid crystal material (26) therebetween, and the circuit (25) is connected by electrical leads (21,23) to electrodes (30,32) positioned on opposite side or surfaces of the liquid crystal material (26), and operationally, with switch (29) open or close to control the field-off state or field-on state of the light transmissive characteristics of the sunroof (10) or window (100) of the liquid crystal (26), and generally, when the liquid crystal material is in the field-on state the light should be transmission, and when the liquid crystal material is in the field-off state the light should be scattering, and that the sunroof or window are glazing panel. McLaughlin indicates (col.8, line 64 - col.9, line 29) that regardless of what the liquid crystal material is made, it should provide such operative function.

McLaughlin does not expressly disclose that the liquid crystal material comprises

a PSCT liquid crystal material including a non-reactive blend of chiral liquid crystal and a monomer, and the monomer lacking the mesogenic group of the general formula: $[Si(CH_3)O]_n$.

However, Khan discloses (col.1, lines 17-61) that stabilized cholesteric liquid crystal have high viscosity which can undesirably increase the response time of these materials when used in electrooptic devices; and exhibits no liquid crystalline phase (i.e., using a polymer which does not have the mesogenic group, and that is the polymer does not have the liquid crystalline phase) will substantially lower the viscosity of the liquid crystal material, so as to improve the properties such as higher contrast ratio, shorter response time and lower voltage requirement. Khan also discloses (col.1, lines 23 – 43; col.7, lines 44 – 60) that in general, the liquid crystal material comprises a chiral material, and the material of chiral nematic liquid crystal greatly reduced the viscosity.

Although Khan does not indicate the monomer lacking the mesogenic group of the general formula is $[Si(CH_3)O]_n$, but the function of lacking the mesogenic group is suggested by Khan for achieving the lower viscosity so as to improve the properties such as higher contrast ratio, shorter response time and lower voltage requirement, and such material, for example, one identified monomer commercial available from Aldrich is Ethylene Glycol Dimethacrylate (EGD) with a chemical structure of $[Si(CH_3)O]_n$, and the material is not new and already exists in the market.

Still lacking is the limitation such that using PSCT liquid crystal material.

However, Hakemi discloses (col.1, line 26 – col.2, line 12) that using Polymer Stabilized Cholesteric Texture (PSCT) liquid crystal material having advantages: (1) haze-free normal-mode and reverse-mode shutters; (2) simplicity of fabrication by eliminating the polarizers and dyes; (3) low voltage requirement; and (4) bistability, and as the concentration of polymer gel is low, there will be no index mismatching and the shutter in the On-state is transparent in all viewing direction (haze-free), and there will be no index mismatching and the shutter in the Off-state is transparent in all viewing direction (haze-free).

Still lacking is the limitation such that using non-reactive blend of chiral liquid crystal.

However, Coker disclose (col.6, line 35 – col.7, line 13) that for the purpose of viscosity reducing diluent, a primary requirement is that such diluents be relatively non-reactive in the blends. Therefore, using non-reactive blend of chiral liquid crystal is a primary requirement to reduce the viscosity so as to improve the response time shorter and fast.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use a polymer lacking the mesogenic group as claimed in claims 40 and 83 for achieving haze-free, shorter response time and wide viewing angle.

3. Claims 46,51,84 and 85 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,749,261 (McLaughlin et al) in view of US 4,961,532 (Tangney), US 6,172,720 (Khan et al) and US 4,131,581 (Coker).

Claims 46, 51, 84, and 85, McLaughlin discloses (col.4, lines 44–47; col.5, lines

28–47; col. 8, lines 14-19; Figs. 2-3) that an electro-optical glazing panel as the explanation above except for the liquid crystal material comprising a non-reactive blend of a chiral crystal and Ethylene Glycol Dimethacrylate.

However, Tangney discloses (col.3, lines 52-53) that the Ethylene Glycol Dimethacrylate is a typical monomer, and that was common and known in that art as using a monomer material such as Ethylene Glycol Dimethacrylate or combinations to make a liquid crystal material. Such material (e.g., commercial available from Adrich) already exists in market, and anyone skilled in the art can use such known material.

Still lacking is the limitation of using a chiral material.

However,Khan discloses (col.1, lines 23-43; col.7, lines 25-43; col.4, lines 44-60) that in general, the liquid crystal material which comprises a chiral material would greatly reduced the viscosity, and improved properties including reduced voltages, shorter pulse times and increased contrast.

Still lacking is the limitation of using non-reactive blend of chiral liquid crystal.

However, Coker disclose (col.6, line 35 – col.7, line 13) that for the purpose of viscosity reducing diluent, a primary requirement is that such diluents be relatively non-reactive in the blends. Therefore, using non-reactive blend of chiral liquid crystal is a primary requirement to reduce the viscosity so as to improve the response time shorter and fast.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use such known material to make a liquid crystal as claimed in

claims 46, 51,84 and 85 for achieving haze-free, shorter response time and wide viewing angle.

4. Claims 56,61,86 and 87 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,749,261 (McLaughlin et al) in view of US 6,049,366 (Hakemi et al), US 4,097,130 (Cole, Jr) and US 6,172,720 (Khan et al).

Claims 56 and 86, McLaughlin discloses (col.4, lines 44–47; col.5, lines 28–47; col. 8, lines 14-19; Figs. 2-3) that an electro-optical glazing panel as the explanation above except for the liquid crystal material comprising a PSCT liquid crystal material including a chiral liquid crystal, a monomer and a dichroic dye.

However, Hakemi discloses (col.1, line 26 – col.2, line 12) that using Polymer Stabilized Cholesteric Texture (PSCT) liquid crystal material having advantages: (1) haze-free normal-mode and reverse-mode shutters; (2) simplicity of fabrication by eliminating the polarizers and dyes; (3) low voltage requirement; and (4) bistability, and as the concentration of polymer gel is low, there will be no index mismatching and the shutter in the On-state is transparent in all viewing direction (haze-free), and there will be no index mismatching and the shutter in the Off-state is transparent in all viewing direction (haze-free).

Still lacking is the limitation such that using a dichroic dye.

However, Cole, Jr discloses (abstract) that a dichroic dye for absorbing an additional wavelength (color) of visible light can be selectively actuatable, so that different combination of visible light wavelengths are absorbed to change the color of light transmitted through the display. Therefore, using dichroic dye, the different

combination of visible light wavelengths are absorbed to achieve a color change of light transmitted through the display.

Still lacking is the limitation is such that using a chiral liquid crystal.

However, Khan discloses (col.1, lines 23-43; col.7, lines 25-43; col.4, lines 44-60) that in general, the liquid crystal material which comprises a chiral material would greatly reduced the viscosity, and improved properties including reduced voltages, shorter pulse times and increased contrast.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use PSCT liquid crystal material and a dichroic dye as claimed in claims 56 and 86 for achieving haze-free and a color change of light transmitted through the display.

Claims 61 and 87, the material of the dichroic dye such as anthraquinone dyes can be identified and commercial available from EMI, e.g., D5, D35, D52 which already exists in market and anyone skilled in the art can use such material as the dichroic dye as the property of the material, and that would have been at least obvious.

5. Claims 62 and 88 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,749,261 (McLaughlin et al) in view of US 4,579,422 (Simonii et al), US 6,172,720 (Khan et al), US 4,131,581 (Coker) and US 6,171,663 (Hanada et al).

Claims 62 and 88, McLaughlin discloses (col.4, lines 44–47; col.5, lines 28–47; col. 8, lines 14-19; Figs. 2-3) that an electro-optical glazing panel as the explanation above except for the liquid crystal material a non-reactive blend of a chiral liquid crystal, a monomer and a surfactant.

However, Simoni discloses (col.3, lines 45-49; Fig.2) that in order to obtain a good planar orientation of the cholesteric mixture (1), the glass plates (2, 2') were repeatedly immersed in a 1% solution of a polymer surfactant. Such that the liquid crystal material comprising a surfactant so as to obtain a good planar orientation of the cholesteric mixture. Although the use of a surfactant in Simoni is for the purpose of facilitating the rubbing step, but according to the property of a surfactant to obtain a good planar that means the panel planar (uniformity) also can be enhanced.

Furthermore, Hanada also discloses (col.17, lines 34-44) that in order to improve the surface smoothness of a layer, various additives such as organic surfactant is used.

Still lacking is the limitation such that using a chiral liquid crystal.

However, Khan discloses (col.1, lines 23-43; col.7, lines 25-43; col.4, lines 44-60) that in general, the liquid crystal material which comprises a chiral material would greatly reduced the viscosity, and improved properties including reduced voltages, shorter pulse times and increased contrast. Khan also indicates (col.9, lines 43-54) that a monomer can be used as viscosity lowering additive so as to increase the response speed.

Still lacking is the limitation such that using a non-reactive blend of liquid crystal,

However, Coker disclose (col.6, line 35 – col.7, line 13) that for the purpose of viscosity reducing diluent, a primary requirement is that such diluents be relatively non-reactive in the blends. Therefore, using non-reactive blend of chiral liquid crystal is a primary requirement to reduce the viscosity so as to improve the response time shorter and fast.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use surfactant as claimed in claims 62 and 88 for achieving a good planar of the material, enhancing the surface treatment and improving the smoothness of the layer.

6. Claims 67 and 89 are rejected under 35 U.S.C. 103(a) as being unpatentable over McLaughlin, Simoni, Khan, Coker and Hanada as applied to claims 62 and 88 above, and further in view of US 6,022,547 (Herb et al).

Claims 67 and 89, lacking the limitation is such that using the material of dimethylsiloxane polymer as the surfactant.

However, Herb discloses (col.20, lines 29-41) that the material of dimethylsiloxane polymer is used as s surfactant. Even though Herb discloses water-in-oil-in-water emulsion, but Herb indicates that the material of the material of dimethylsiloxane polymer is used as s surfactant. The reference Herb is an evidence to show that using Poly (dimethylsiloxane) as a surfactant, and that was common and known in that art, and that would have been at least obvious for improving the surface smoothness of a layer.

7. Claims 42-44, 47-49, 52-54, 57-59 and 63-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over McLaughlin, Khan, Tangney, Hakemi, Cole,Jr, Coker, Hanada and Simoni, as applied to claims 41, 46, 51, 56 and 62 above, and further in view of US 5,691,795 (Doane et al).

Claims 42-43, 47-48, 52-53, 57-58 and 63-64, lacking limitation is such that the operation mode of total-scattering and total-transmission.

However, Doane discloses (col.6, line 64 – col.10, line 60; Figs. 1-3) that the polymer-liquid crystal material (electro-optical glazing structure) is light scattering (total-scattering mode) in a field-Off condition and optical clear (total-transmission mode) in a field-On condition. An AC voltage source (17) controls the polymer domains in order to switch the cell between different optical states, and it does not need to use any energy absorbing mechanisms (do not require polarizers which limit the brightness and without the need of color filters which also reduce brightness), such that the operation mode can be electrically-activated or switched, i.e., in the field-Off condition the material is strongly light scattering (total-scattering), and when the field turned on the material is optically clear (total-transmission), and the wavelengths are in the ultra violet (UV portion), and the cell is haze free at all viewing angle.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to operate in the scattering mode and transmission mode as claimed in claims 42-43, 47-48, 52-53, 57-58, 63-64 for achieving haze free at all viewing angle used as an optical glazing panel.

Claims 44, 49, 54, 59 and 65, lacking limitation ia such that the operation wavelength band.

However, Doane discloses (col.3, line 66 – col.4, line 18) that the wavelength of the light reflected by the material is given by the relation $\lambda=np$ (n is the average refractive index, p is the pitch length), and the wavelength is about infra-red and below ultra-violet, i.e., a broad band electromagnetic spectrum of operation including the UV

light, infra-red or visible light, and that was common and known in the art to tailor the band to the required application.

Therefore, it would have been obvious in the device of Doane to employ a wide band including near-IR, visible and near-UV in order to tailor the operation to the band required for any given application.

8. Claims 45, 50, 55, 60 and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over McLaughlin, Khan, Tangney, Hakemi, Cole,Jr, Coker, Hanada and Simoni, as applied to claims 41, 46, 51, 56 and 62 above, and further in view of US 5,667,897 (Hashemi et al).

Claims 45, 50, 55, 60 and 66, lacking the limitation is such that using float-glass as the transparent substrates.

However, Hashimi discloses (col.1, lines 49 - 51) that float-glass processing is the conventional way of producing sheet glass, and used for automotive and architectural uses through the world.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use float-glass substrates as claimed in claims 45, 50, 55, 60 and 66 for producing sheet glass.

Response to Arguments

9. Applicant's arguments filed on Feb.9, 2004 have been fully considered but they are not persuasive.

Applicant's arguments are as follows:

1) The references do not have any motivations to combine.

Examiner's responses to Applicant's responses are as follows:

1) The reference McLaughlin discloses (col.4, lines 44-47; col.5, lines 28-47; col.8, lines 14-19; Figs. 2-3) that the liquid crystal sunroof (10) includes two transparent surfaces (22,24) and liquid crystal material (26) therebetween, and the circuit (25) is connected by electrical leads (21,23) to electrodes (30,32) positioned on opposite side or surfaces of the liquid crystal material (26), and operationally, with switch (29) open or close to control the field-off state or field-on state of the light transmissive characteristics of the sunroof (10) or window (100) of the liquid crystal (26), and generally, when the liquid crystal material is in the field-on state the light should be transmission, and when the liquid crystal material is in the field-off state the light should be scattering, and that the sunroof or window are glazing panel. McLaughlin indicates (col.8, line 64 - col.9, line 29) that regardless of what the liquid crystal material is made, it should provide such operative function.

The reference Khan discloses (col.1, lines 17-61) that stabilized cholesteric liquid crystal have high viscosity which can undesirably increase the response time of these materials when used in electrooptic devices; and exhibits no liquid crystalline phase (i.e., using a polymer which does not have the mesogenic group, and that is the polymer does not have the liquid crystalline phase) will substantially lower the viscosity of the liquid crystal material, so as to improve the properties such as higher contrast ratio, shorter response time and lower voltage requirement. Khan also discloses (col.1, lines 23 – 43; col.7, lines 44 – 60) that in general, the liquid crystal material comprises a

chiral material, and the material of chiral nematic liquid crystal greatly reduced the viscosity.

The reference Hakemi discloses (col.1, line 26 – col.2, line 12) that using Polymer Stabilized Cholesteric Texture (PSCT) liquid crystal material having advantages: (1) haze-free normal-mode and reverse-mode shutters; (2) simplicity of fabrication by eliminating the polarizers and dyes; (3) low voltage requirement; and (4) bistability, and as the concentration of polymer gel is low, there will be no index mismatching and the shutter in the On-state is transparent in all viewing direction (haze-free), and there will be no index mismatching and the shutter in the Off-state is transparent in all viewing direction (haze-free).

The reference Coker disclose (col.6, line 35 – col.7, line 13) that for the purpose of viscosity reducing diluent, a primary requirement is that such diluents be relatively non-reactive in the blends. Therefore, using non-reactive blend of chiral liquid crystal is a primary requirement to reduce the viscosity so as to improve the response time shorter and fast.

The reference Tangney discloses (col.3, lines 52-53) that the Ethylene Glycol Dimethacrylate is a typical monomer, and that was common and known in that art as using a monomer material such as Ethylene Glycol Dimethacrylate or combinations to make a liquid crystal material. Such material (e.g., commercial available from Adrich) already exists in market, and anyone skilled in the art can use such known material.

The reference Simoni discloses (col.3, lines 45-49; Fig.2) that in order to obtain a good planar orientation of the cholesteric mixture (1), the glass plates (2, 2') were

repeatedly immersed in a 1% solution of a polymer surfactant. Such that the liquid crystal material comprising a surfactant so as to obtain a good planar orientation of the cholesteric mixture. Although the use of a surfactant in Simoni is for the purpose of facilitating the rubbing step, but according to the property of a surfactant to obtain a good planar that means the panel planar (uniformity) also can be enhanced.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (571) 272-2299. The examiner can normally be reached on M-T 8:00 am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mike Qi
March 29, 2004

TARIFUR R. CHOWDHURY
PRIMARY EXAMINER